

WHAT IS CLAIMED IS

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1. A dynamic virtual channel management apparatus, comprising:

10 a detection unit which detects an active virtual channel used by an arriving ATM cell; and
a management memory unit which manages management information about the active virtual channel detected by the detection unit for each virtual channel,
15 wherein processing on a frame-by-frame basis is applied to cells having a virtual channel identifier that matches that of the active virtual channel managed by the management memory unit.

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25 2. The dynamic virtual channel management apparatus as claimed in claim 1, comprising a first registration unit which registers a virtual channel identifier of an arriving cell into the management memory unit when the virtual channel identifier of the arriving cell is not managed by the management memory unit.

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35 3. The dynamic virtual channel management apparatus as claimed in claim 2, wherein the management memory unit comprises:
a translation table that converts the virtual channel identifier contained in a cell

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header of the cell into an internal management number for internal management; and
5 a frame management table that stores information for frame-by-frame processing of each virtual channel in such a manner as to correspond to the internal management number.

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4. The dynamic virtual channel management apparatus as claimed in claim 3, comprising:
15 an internal management number writing unit which writes the internal management number into the cell header of the cell; and
an internal management number reading unit that retrieves the internal management number from the cell header of the cell, and uses the
20 retrieved internal management number for referring to the frame management table.

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5. The dynamic virtual channel management apparatus as claimed in claim 3, wherein the internal management number is
30 transmitted in parallel with the cell data, and is used for referring to the frame management table.

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6. The dynamic virtual channel management apparatus as claimed in claim 2,

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comprising:

a timer unit which is provided for each virtual channel managed by the management memory unit;

5 a timer start unit which starts the timer unit each time a head cell of a frame arrives; and

10 a first deletion unit which deletes from the management memory unit an entry of a virtual channel that corresponds to a last cell of a frame arriving after the timer unit indicates a time-out.

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7. The dynamic virtual channel management apparatus as claimed in claim 2, comprising:

20 a timer unit which is provided for each virtual channel managed by the management memory unit;

a timer start unit which starts the timer unit each time a head cell of a frame arrives; and

25 a second deletion unit which deletes an entry of a virtual channel from the management memory unit when a corresponding timer unit indicates a time-out before a head cell of a next frame arrives.

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8. The dynamic virtual channel management apparatus as claimed in claim 7, wherein the timer unit comprises:

a shifting unit which shifts virtual

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channel information;

5 a frame number counting unit which counts a number indicative of how many frames are shifted by the shifting unit on a virtual-channel-to-virtual-channel basis;

10 a count-up unit which counts up the frame number counting unit of a virtual channel which corresponds to a head cell of a frame that arrives; and

15 a count-down unit which counts down the frame number counting unit of a virtual channel which corresponds to virtual channel information that is shifted-out from the shifting unit, wherein a virtual channel for which the

15 count number of the frame number counting unit becomes zero is given a time-out.

20 9. The dynamic virtual channel management apparatus as claimed in claim 2, comprising a third deletion unit which deletes from the management memory unit an identifier of a virtual channel of a last cell of a frame whose

25 arrival is detected.

30 10. The dynamic virtual channel management apparatus as claimed in claim 2, comprising a disapproving unit that disapproves registering of a virtual channel identifier of a cell into the management memory unit if a cell

35 belonging to a virtual channel that is not managed arrives while the management memory unit is fully occupied.

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11. The dynamic virtual channel
5 management apparatus as claimed in claim 2,
comprising a first registration determination unit
which determines whether a virtual channel is
allowed to be registered into the management memory
unit based on a cell holding-up volume of a cell
10 memory at a later stage and a threshold when a
cell having a virtual channel identifier that is
not managed by the management memory unit arrives.

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12. The dynamic virtual channel
management apparatus as claimed in claim 7,
comprising a fourth deletion unit which finds a
20 virtual channel that is close to a time-out of the
timer unit, and forcing the found virtual channel
to be given a time-out, and deletes an entry of
the found virtual channel from the management
memory unit when a cell having a virtual channel
25 identifier that is not managed arrives while the
management memory unit is fully occupied.

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13. The dynamic virtual channel
management apparatus as claimed in claim 2,
comprising:
35 a VC number counting unit which counts a
number indicative of how many virtual channels are
managed by the management memory unit on a
virtual-path-to-virtual-path basis; and

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a second registration determination unit which allows a registration into the management memory unit when a cell having a virtual channel identifier that is not managed by the management 5 memory unit arrives only when the number counted by the VC number counting unit corresponding to a virtual channel of an arriving cell is not above a predetermined value while a number indicative of how many entries are present in the management 10 memory unit exceeds a predetermined value.

15 14. The dynamic virtual channel management apparatus as claimed in claim 2, comprising:
a signaling extraction unit which extracts a signaling message cell;
20 a registration unit which registers a virtual channel identifier of a connection into the management memory unit when a signaling message to establish the connection is detected by the signaling extraction unit; and
25 a fifth deletion unit which deletes the virtual channel identifier of the connection from the management memory unit when a signaling message to release the connection is detected by the signaling extraction unit.
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15. The dynamic virtual channel 35 management apparatus as claimed in claim 2, wherein the management memory unit is implemented as a CAM.

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5 16. The dynamic virtual channel
management apparatus as claimed in claim 1,
comprising:

10 a cell memory which stores cells;
a frame management unit which keeps a
record of each virtual channel registered in the
management memory unit as to whether a head cell
of a frame was passed for storage into the cell
memory or discarded,
15 wherein a determination is made by
referring to the frame management unit as to
whether to pass or discard subsequent cells of
said frame.

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17. The dynamic virtual channel
management apparatus as claimed in claim 16,
wherein the frame management unit keeps a record
25 of whether a cell of a given frame is discarded
after a head cell of the given frame is read from
the cell memory while a last cell of the given
frame has not been inputted into the cell memory,
and wherein if the cell of the given frame is
30 discarded, following cells except for the last
cell of the given frame are discarded.

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18. The dynamic virtual channel
management apparatus as claimed in claim 16,

comprising:

a cell quantity counting unit that counts a number indicative of how many cells have arrived for each virtual path;

5 a marking unit which marks a cell on a frame-by-frame basis when a counted number of the cell quantity counting unit exceeds a predetermined number, and

10 a discarding unit which discards cells that are marked when an accumulated cell amount in the cell memory exceeds a threshold.

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19. The dynamic virtual channel management apparatus as claimed in claim 1, comprising:

20 a plurality of cell memories which store cells for respective priority levels; and a distribution unit which distributes arriving cells to a corresponding cell memory according to a priority level predetermined for each virtual channel.

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30 20. The dynamic virtual channel management apparatus as claimed in claim 19, wherein the plurality of the cell memories output the stored cells in a descending order of the priority levels.

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